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PROCEEDINGS OF SCIENTIFIC SOCIETIES.

Natural Science Association of Staten Island.—June 10, 1893.—Mr. Wm. T. Davis exhibited specimens of *Iva frutescens* and read the following paper upon "The Influence of the Past Winter on the High-Water Shrub."

An examination of the High-Water Shrubs, (*Iva frutescens,*) during the past few days, has disclosed an interesting fact, which is no doubt entirely due to the severe weather of the past winter. A glance along the meadow creeks show, as yet, but a gray line of bushes with numerous short sprouts starting either at their roots or a few inches above them on last year's wood. On the 7th of May, 1892, while observing the sea-side finches, the High-Water Shrubs were noticed to be coming into leaf midway up the stems, and by the middle of May it was difficult to secure a good view of the finches owing to the number of leaves. This year there would be no difficulty, for even at this date they are as bare as in the winter, having retained their vitality for only five or six inches above the ground. Some of the dead *Iva* stems show evidence of being three or four years old, so there is this proof also that the past winter has been the hardest one for the species during at least that length of time.

Mr. Davis also read the following: "Local Notes upon the Opossum and Red Fox."

The opossum visitation, which was commented upon in these Proceedings for March 12, 1892, has in no wise abated, and during the past year quite a number were killed on the island.

No less than fourteen opossums have been taken at Watchogue and the neighboring hamlets within a short period. It was thought by the residents, that they were possibly imported on the railroad, as the completion of the bridge and the appearance of the opossums were so nearly coincident. However, the causes given in the Proceedings referred to above, are probably the correct ones. In the winter of 1891–92, a dog owned by Mr. George Marsac, who lives at Watchogue, caught two opossums, one of them under the piazza floor. This past winter, Mr. Marsac and Mr. John De Bau found four opossums in a hollow gum tree; Mr. George Decker and Mr. Marsac caught two others, and Mr. Orville Merrill, one; Mr. George Merrill, one; Mr. Smith one in his cellar, and Mr. Van Pelt, who lives near Bull's Head, found one in his chicken house. Mr. Drake, of Old Place, heard a disturbance in his chicken house last summer, and discovered, upon investigation, an opossum, which he promptly killed. On April 30, 1892, I found a very much decayed opossum in the woods near Watchogue, and even under such circumstances it had the peculiar fatty odor for which the animal is remarkable.

Mr. Gratacap has informed me of an opossum captured on Bement Avenue, West New Brighton, and Mr. Galloway, of one killed on the Leonard White place, in Middletown. One was secured on the Mc Andrew place last winter ; one on the Meissner place at Richmond by Mr. Lyle, and one in the Moravian Cemetery by Mr. Albert.

This spring, Mr. Samuel Henshaw showed me a dead opossum under an apple tree near the brook that crosses the Manor Road ; Mr. Joseph C. Thompson found one near Arrochar, and Mr. Perry Cornell, on the 9th of April, caught a twelve pounder in the old iron ore mines on the slope of Todt Hill.

From the above facts and those presented in the Proceedings of March 12, 1892, it appears that the opossum has become well established on our Island, and that thirty-six individuals have been captured during the last four years. Of course, the record can only be considered as partly complete.

In connection with the opossum visitation, it may be well to record a few memoranda concerning the foxes that have been found on the island within the last few years. In 1887 or '88, one was killed by Mr. Cole, who resides on the Amboy Road, near Oakwood. It was believed at the time to be the individual that escaped from the superintendent of the railroad. In July, 1890, the *Richmond County Standard* printed an account of the foxes that had been killed or seen in the vicinity of Richmond. It was believed that the original pair either escaped from the hunters of the Country Club, or from the captain of a canal boat, which had several on board, while discharging his cargo of coal at Richmond Creek. The animals destroyed many fowls on the Dedker and Latourette farms, and on the former of these places a young fox was trapped, the jaws holding him by the toes. In the morning, it was found that his mother had evidently been busy all night, as his shoulders were lacerated by her efforts to secure his release. Another fox was shot by Mr. Decker, while it was killing a Guinea hen.

Last summer, Mr. Freemans of Old Place, was on the meadows near his home engaged with some companions in surveying, when they discovered a family of foxes beneath a hay stack. The male ran away upon the approach of danger, but the mother and five young were finally secured.

The following paper, by Mr. Arthur Hollick, in the absence of the writer, was read by the title "Notes on the Geology of the New Railroad Cut at Arrochar."

In a previous contribution on the Cretaceous formation of Staten Island, (Proc. Nat. Sci. Assn. S. I., Jan. 9, 1892), I mentioned the discovery of Cretaceous fossils at Arrochar, and called special attention to specimens of *Cardium dumosum* Conrad, which were found in a seam or stratum of sandy clay, which I was inclined to think might represent the outcrop of more extensive strata not far below. Recent excavations for a new railroad cut in the vicinity led me to hope that the overlying Drift deposits might be penetrated to a sufficient depth to expose these strata, which, from the surface indications, we know can not be very far away. Several visits were made while the work was in progress, but it was not until last week that the excavation was completed and, fortunately for the geologist, the heavy rain of the 6th inst. followed immediately afterward and washed everything clean in a most gratifying manner, affording unusually favorable conditions for final observation during the past few days.

At the base are masses or beds of bluish, semi-plastic and sandy clay, from which extend upward irregular seams and smaller masses, interbedded with fine sands and gravels, in which "flow and plunge" structure is generally well marked. This series of deposits reaches the surface at about where the new Arrochar station is located, and from thence southward are all that is to be seen. The bowlder till thins out to a feather edge where the sands and clays come to the surface and gradually become thicker northward, until finally it is all that is visible in the cut. The deepest part of the cut shows the entire series from base to summit and give us a 50 foot section in a N. and S. direction, through the extreme edge of the terminal moraine. Irregular masses of clay, accompanied by water-assorted sands and gravels at the base capped by the unassorted bowlder till on top. The thickening of the bowlder till northward and the position of the underlying materal give a general appearance of north to northwestward dip for the entire series.

No positive evidence of any Cretaceous strata in place could be found, but on the other hand a large part of the sands and gravels are manifestly reassorted Cretaceous material. The characteristic ferruginous sandy clay concretions in which most of our Cretaceous fossils have been found are abundant, and the sandy clay stratum in which the *Cardiums* previously mentioned were found, may be traced into the cut, with its accompanying sands and gravels. It can no longer be regarded as an outcrop, as other similar seams or masses are quite prominent, interbedded with the sands and gravels. In some places coarse gravel and clay nodules are so cemented together with limonite that a firm conglomerate is formed. Iron is everywhere abundant. In some hand specimens of the conglomerate may be seen pyrite, magnetite and limonite and spring waters are impregnated with the sulphate. Acc [illegible] tic iron sand may also been seen in places. Yellow Gravel or Pre-Glacial Drift is also, to a limited extent, a constitutent of the assorted material.

It is evident that only the upper part of the clay has been reached and this is very much disturbed and crumpled, portions having been torn off from the main mass below, forming the irregular beds or seams associated with the sands and gravels. The indications are that these were all deposited previous to the advent of the glacier which shoved them ahead and finally left them overlapped by the thin edge and flanked on the north by the mass of the bowlder till.

The character of the clay is not that of our ordinary bowlder clay, which is nearly always colored red from the prevailing constitutent—eroded Triassic sandstone and shale. These clays are bluish and the rock from which they were formed is not anywhere in evidence at the present time. The large amount of mica and the occasional fragments of mica schist, hornblende schist and granite which are to be found throughout all the underlying deposits at Arrochar may perhaps be accounted for on the theory of a belt of such rocks to the south and east of the serpentine ridge which has suffered decomposition and erosion and thus formed the source of supply for the bluish clay and micaceous fragments. Such a belt is theoretically present, for we know that it exists to the east of the serpentine at Tompkinsville and St. George. This theory is emphasized by the position of the clay which is beneath and older than the bowlder till and would thus have been formed independent of material from the red Triassic area which did not suffer extensive erosion until it had been overridden by the glacier. One lenticular basin of clay in the upper part of the till north of the morainal edge, deserves attention from the fact that the clay there formed is typical reddish bowlder clay, horizontally stratified and evidently undisturbed since its deposition, which must have been subsequent to the retreat of the glacier. This was the source from which the erstwhile brick yard at Arrochar obtained its material for the manufacture of building brick. The comparison between this red, horizontally stratified clay in the till above, and the bluish distorted masses beneath is striking.

One feature that will doubtless be noticed at once by everyone who examines the material in the moraine at Arrochar, is the quantity of soapstone and limonite ore contained in it, evidently due to the erosion of the serpentine ridge which near this point was crossed by the glacier.

Summarizing the results of our facts and observations we may picture to ourselves the former coastal plain, consisting of Cretaceous and later deposits, extending to the base of the serpentine ridge, with a belt of schistose or gneissic rocks around its base. On the advent of the glacier, advancing from the northwest these deposits were eroded and pushed ahead by the ice mass and assorted by the torrents which flowed from it, and which, on its retreat, left the deposits of the till, forming a superficial unassorted cap, composed of fragments of rocks from the north, in which the Triassic sandstones, shales and traps of New Jersey are the most abundant constituents. In the depressions of the till, local deposits of gravel, sand and clay would accumulate, colored with the prevailing red from the eroded Triassic rocks.

September, 9.—Dr. N. L. Britton showed a specimen of *Agrimonia mollis* as an addition to the flora of the Island. This and the commoner *A. striata,* have been included in manuals under *A. eupatoria* which is, however, a European species.

Mr. Arthur Hollick presented a piece of Triassic sandstone, found in the Drift at Arrochar, by Miss Grace Hollick, on which were casts of a plant stem.

Although Triassic shale and sandstone were among the most abundant of our Drift material this is the first specimen in which we have been able to identify any indication of a fossil. A carefully prepared drawing was submitted to Professor Lester F. Ward, palæobotanist of the U. S. Geological Survey, and was by him submitted to Professor Wm. M. Fontaine, who concluded that it was probably *Equisetum rogersi* Schimp. If so this is not only an interesting addition to our list of Drift fossils but is of interest also on account of its rarity in the Triassic of New Jersey, from whence it must have been derived. So far as I know New Milford is the only locality in New Jersey from which it has been reported.

Mr. Wm. T. Davis read the following miscellaneous memoranda and exhibited the specimens mentioned.

During the past summer the Periwinkle (*Littorina litorea*) has been found in some numbers alive on the shore at the Narrows, and also on the rocks at Princes Bay. In these Proceedings for January 14, 1888, Mr. Sanderson Smith, upon the finding of an empty shell at the Narrows by Mr. Hollick, gave an account of the southward migration of the species along the Atlantic Coast, noting its occurrence on Long Island, etc. This is the first record of its being found alive on our Island.

Mr. Leng recently collected in Augur Lake, near Keeseville, N. Y., a rare *Dytiscus* beetle, probably *D. harrisii*, which he brought home alive in a tin can as his alcohol bottle was not sufficiently large. Upon opening the can for the inspection of the insect, we were pleased to find a dark brown *Gordius* worm of unusual size. After carefully untwisting and unkotting the tangled creature, which took our united efforts, we measured it with a rule, and discovered that it was twenty-eight inches long. In Dr. Packard's zoology it is stated that hair-worms "live in ground-beetles and locusts," twisting around the intestines of their hosts.

The severe storms of the 24th and 29th of August blew many green hickory nuts from the trees, and in spite of their unripe condition the shell-bark nuts were promptly devoured by gray squirrels. Under one of the trees on Richmond Hill, there were many quarts of the outer green husks gnawed fine, and of the nuts from which the kernel had been extracted after the outer bitter covering had been wholly or in part removed. It appears from this that it is probably the firmness of their attachment to the end of the tree branches, and not their green husks, that prevent the unripe hickory nuts from often being eaten by squirrels.

This morning a green example of the walking-stick insect (*Diapheromera femorata*) was found in the Clove Lake swamp on a golden rod. Though common northward, in the Hudson River valley, it is rare with us, and this is only the fifth recorded specimen from our Island.

Mr. Davis also exhibited some exotic water plants that had been introduced by some person of an experimental turn into one of the numerous small ponds in the woods north of the Moravian Cemetery. Among them was the Chillian Mermaid-weed, the South American Pond weed (*Eichornia crassipes*), a lily and one of the sedges, all of which seem to do well among the native plants.

Boston Society of Natural History.—November 1st.—The following paper was read:

Professor George Lincoln Goodale, " On the cultivation of Tea, Coffee and Cacao. Illustrated by stereopticon views of plantations in Ceylon and Java.—SAMUEL HENSHAW, *Secretary*.

The Biological Society of Washington.—October 21. The following communications were read:

Professor Lester F. Ward, "Weismann's Concessions." Doctor C. Hart Merriam, "Notes on a Biological Reconnoisance of Wyoming." Mr. Vernon Bailey.

November 4th.—The following communications were read:

Mr. W. T. Swingle, "Some Problems of Plant Geography in Florida." Doctor C. Hart Merriam, "Fauna and Flora of Eastern Wyoming." Doctor C. W. Stiles, "Artificial Species of Cestodes." Professor Lester F. Ward, "Cycadean Trunks in the American Cretaceous."—FREDERIC A. LUCAS, *Secretary.*

NATIONAL ACADEMY OF SCIENCE.—The following papers were entered to be read at the meeting held at Albany, N. Y., November 7th, 1893.—I. American Palæozoic Cockroaches, Samuel H. Scudder. II. Additional Researches on the Motion of the Earth's Pole, Seth C. Chandler. III. Biographical Memoir of A. H. Worthen, C. A. White IV. Biographical Memoir of W. P. Towbridge, C. B. Comstock. V. The Geological Map of the State of New York, James Hall. VI. On a new form of Telescopic Objective, as applied to the twelve-inch Equatorial of the Dudley Observatory, Charles S. Hastings. VII. On the Structure and Development of Trilobites, Charles E. Beecher, (Introduced by A. Hyatt.) VIII. Double Stars, Asaph Hall. IX. Latitude Determinations at the Sayre Observatory, Charles L. Doolittle, (Introduced by Lewis Boss.) X. Insect Voices, Joseph A. Lintner, (Introduced by James Hall.) XI. Edible and Poisonous Fungi, Charles H. Peck, (Introduced by James Hall.) XII. A New Process of Printing in Color, Edward S. Morse. XIII. On Reaction—Times and the Velocity of the Nervous Impulse, J. McKeen Cattell and Charles S. Dolley, (Introduced by G. F. Barker.) XIV. The Palæontology of the State of New York; the present condition of the work, James Hall. XV. Certain Histological Relations Between the Subalpine Plants of the White Hills and of the Labrador Coast, George Lincoln Goodale.

A special stated session of the Academy took place on Wednesday, November 8th, in Albany, to consider the President's Annual Report to Congress, and other business.

The new Dudley Observatory was dedicated. Prof. Newcomb made the speech for astronomy and there were other speeches by Mr. Lansing and Bishop Doane, Gen. Rathbone was master of ceremonies.